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(54) Teat cup lining

(57) A teat cup milking inflation 1 has a double co-axial barrel form with the upper barrel 11 locatable on the animal's teat and the lower barrel 12 communicating with the upper teat barrel via a waisted portion 13 having a bore 14 and a lower milk outlet tube part 10 to which suction is applied, both barrels being located with a rigid shell 6 and the lower barrel 12 being also partially collapsible under the pulsating vacuum/air pressure. The portion 13 is thickened and the inner wall is provided with grooves 15, with the aim of preventing "crawl".

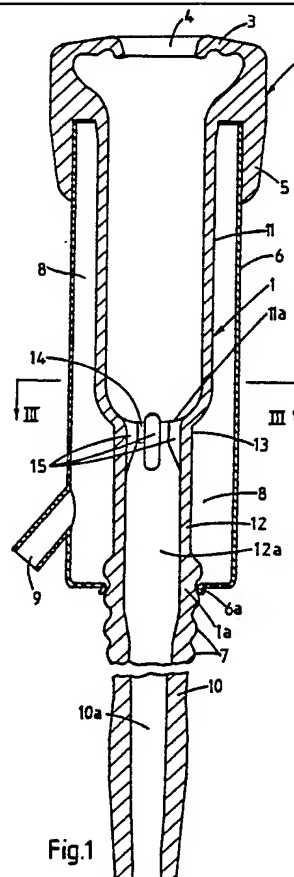
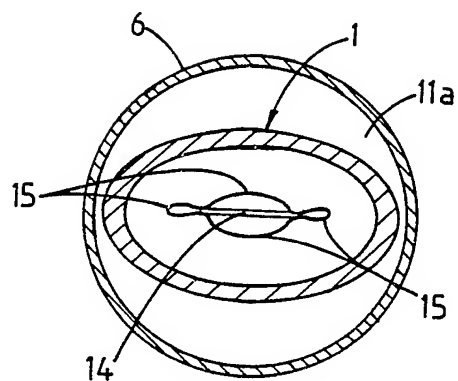
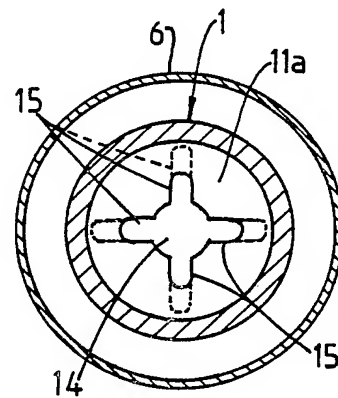
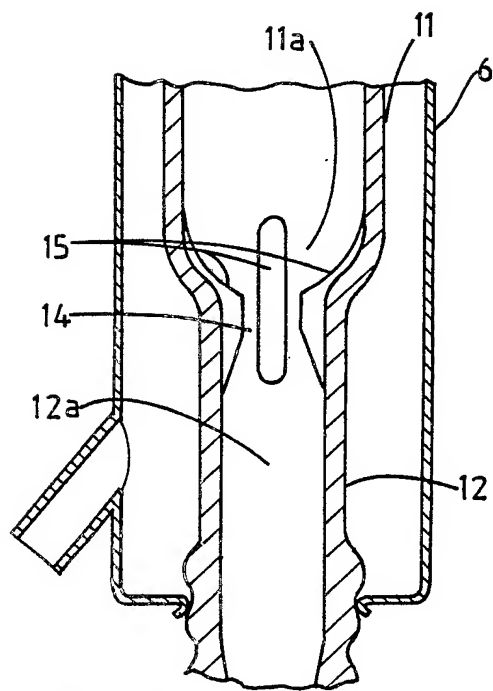
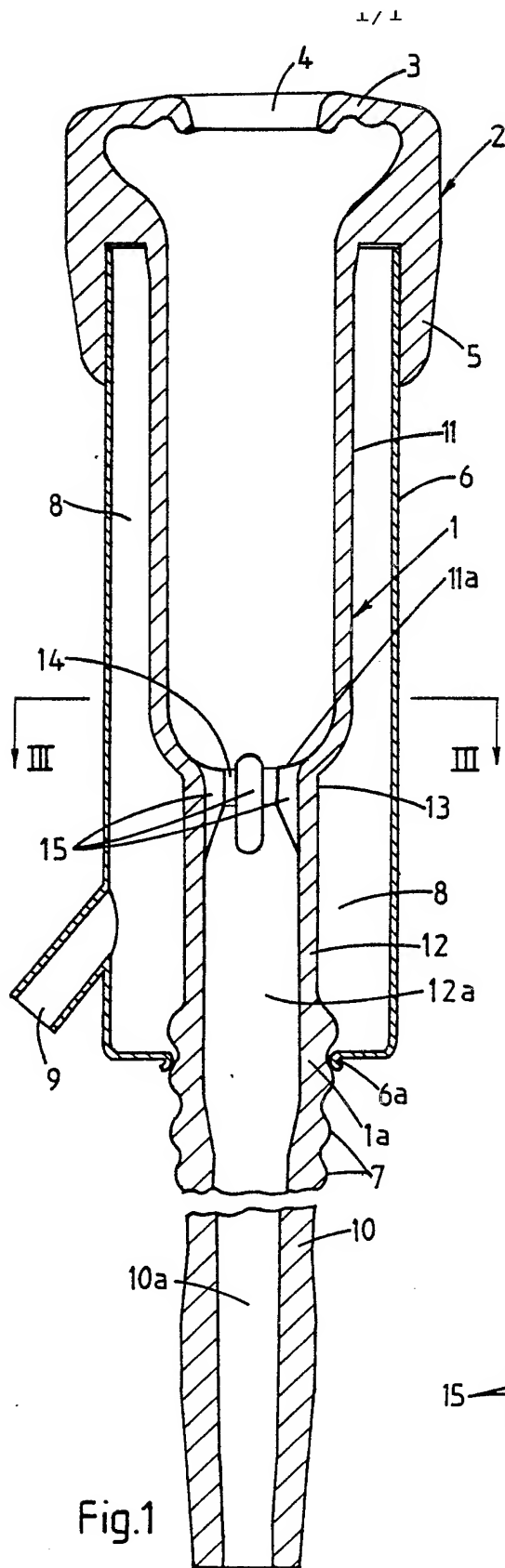


Fig.1

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SPECIFICATION

Teat cup lining

- 5 This invention relates to milking inflations for dairy milking equipment.

Various problems have existed over the years in connection with the milking of cows, and numerous forms of milking inflations and milking teat cup assemblies have been devised in an endeavour to combat such problems. One problem that does not appear to have been overcome is that of a tendency for milking inflations or teat cups to "crawl" or move lengthwise of an animal's teat due to the vacuum applied to the milk line and the pulsating action applied to the milk cup assembly, and this can cause discomfort so some animals and in particular those with shorter teats.

Accordingly it is one object of this invention to provide a milking inflation overcoming any tendency to "crawl" during milking operations.

25 Another continuous problem arising in dairying operations is that of mastitis developing in the cow's teats, and it is another object of this invention to provide an improved teat cup milking inflation which it is believed will assist in the prevention of mastitis in an animal.

Other and more particular objects and advantages of the invention will become apparent from the ensuing description.

According to this invention there is provided a teat cup milking inflation comprising a resilient upright tubular body part arranged to be located and contained within an upright rigid tubular shell with upper and lower portions of the body part being respectively sealably engageable with upper and lower parts of the shell, an annular space being formed about the contained body part and to which a pulsating vacuum or pressure can be applied, said contained body part being divided into an upper section and a communicating lower section by an intermediate waisted portion with the upper section arranged for location about an animal's teat and having an upper collar part defining the inflation mouth, and the lower section having its lower end part connectable to a vacuum milk line.

One preferred form of the invention will now be described by way of example and with reference to the accompanying drawings, in which:—

Figure 1: is a longitudinal cross-sectional view of an inflation in accordance with the invention and located in a teat cup shell for milking operations,

Figure 2: is a fragmentary long sectional view illustrating a modification to the arrangement shown in Fig. 1, and

Figure 3: is a plan view on line III-III of Fig. 1, with Fig. 3A showing a partial collapse

of the inflation.

The inflation may be constructed by any suitable means from such as a natural or synthetic rubber material or from an elastomeric vinyl plastics material such as a polyvinyl chloride or other suitable plastics material having properties desirable in the construction of milking inflations i.e. desirable resilient qualities and qualities facilitating cleaning and sterilizing of the inflation without the inflation absorbing or retaining any of the cleaning or sterilising agents which would irritate an animal or contaminate milk received from the animal.

80 The inflation has a resilient tubular body part 1 which merges into an upper integral head part 2 including an inwardly directed flange or collar 3 having an inner periphery defining the inflation mouth 4. The head part 2 further has an outer downwardly extending annular flange 5 spaced from the body part 1 and locatable about a teat cup shell 6 within which the inflation body part 1 is contained. The teat cup shell 6 may be of metal or any other suitable rigid material and the outer flange 5 is arranged to seal on the upper outer part of the shell 6, the shell being cylindrical in form.

The lower end portion of the body part 1 is sealably engaged with and extends through an apertured lower end portion 6a of the teat cup shell 6 and may be provided with two or more outer annular strengthening and sealing ribs 7 in the usual manner. The teat cup shell 6 is of larger diameter than the inflation body part 1 so as to provide an annular space 8 thereabout between the upper and lower sealed portions and to which pulsating vacuum/air can be applied by way of an appropriate inlet 9. A tubular extension 10 to the lower end portion of the contained body part 1 is provided for connection to a main vacuum milk line.

The invention particularly lies in the provision of a two-section or two-barrel body part contained within the teat cup shell by providing a waisted intermediate portion 13 having a passage or bore 14 connecting the upper section 11 with the lower section 12 and being strengthened by a thickening of the wall at the waisted portion and/or at the top of the lower section to prevent collapsing of the passage 14 in operation.

The upper section 11 is shaped to receive an animal's teat and can be shorter in length than conventional milking inflations so that a conventional teat cup shell can be utilised, and the lower outlet end of an animal's teat can (although not necessarily) abut the lower end 11a of the upper section at the waisted intermediate portion 13. The wall thickness of the lower section 12 can be the same thickness as or slightly thicker than the wall thickness of the upper teat receiving section 11, provided always that the upper section is

readily collapsible and flexible in use for effective milking, and the lower section 12 is also flexible and resilient and at least partially collapsible.

5 The upper section 11 is thus designed to collapse around a teat during pulsation, and, for efficient application of vacuum to the lower end of the teat and at the same time provide a means for relieving vacuum stress at
10 the teat end around the milk outlet orifice or canal during the milking and pulsating cycles, the inner wall defining the bore 14 of the intermediate waisted portion 13 can be provided with at least one but preferably two or
15 more grooves or recesses 15 facilitating communication between the upper and lower sections 11, 12, particularly for cases where the lower end of the animal's teat abuts the lower end 11a of the upper section 11.

20 Accordingly, in the present invention the thickened wall part at the junction 13 and forming the teat end abutment surface 11a is relieved by a plurality (at least three but preferably 4, as shown) of equally spaced
25 longitudinally channels or slots 15 leaving intermediate teat end abutment portions 13 but providing further communication for vacuum between the lower barrel part chamber 12a and milk line and the lower end portion
30 of the inflation upper part 11, to spread vacuum pressure more evenly around the lower end portion of the animal's teat in avoiding vacuum stress concentrated on the orifice or canal end part of the animal's teat
35 and providing for a smoother flow of milk into the bore 14, lower barrel part chamber 11a and tubular extension bore or outlet 10a to the milk line.

The arrangement of Figs. 1 and 3 shows
40 the longitudinal channels 15 formed in the main thickened wall part at the junction 13 between the upper and lower barrel parts 11 and 12; but in a modification of the invention illustrated by way of example in Fig. 2 (and in
45 broken outline in Fig. 3), the upper end portions of the channels 15 are carried further upwardly around the arcuate lower teat end abutment portion 11a of the upper barrel part 11 to further spread the vacuum pressure
50 over the teat end and improve milk flow into the bore 14.

In addition to the spreading of vacuum pressure in the milk line at the junction 13 between the upper and lower barrel parts 11
55 and 12 and onto the animal's teat end, the channels 15 further enable a partial collapsing of the junction 13 and lower portion of the inflation upper barrel part 11, due to the weakening of the thickened wall, and such
60 collapsing or partial collapsing enables the desired squeezing action on the animal's teat to be spread around the lower end portion of the teat adjacent the orifice or outlet canal, and at the same time the plurality (not less
65 than three and preferably at least four) of the

channels 15 provides that the bore opening at the junction 13 cannot be completely closed off and thus the vacuum stress on the animal's teat lower end is at all times relieved.

70 This partial collapsing without closure of the bore 14 is illustrated in Fig. 3A of the drawings.

With a variation in animal teat size, an efficient collapse of the inflation for squeezing
75 of the animal's teat is not always possible, and accordingly the provision of a second collapsible chamber 12a in the lower section 12 of the inflation body 1 contained within the teat cup shell 6 provides a compensating
80 effect, and a rest period during the pulsation cycle is assured and damage to the animal's teat orifice is less likely.

Further, the longitudinal channel 15 and partial collapsing of the junction part 13 can
85 enable the employment of a very much shorter compensatory lower barrel part 12 of the inflation, and the provision of the shortened teat engaging upper section 11 of the inflation provides a positive limit to the amount of
90 upward travel of the inflation that can take place during milking operations; and abutment of the orifice end of the animal's teat against the lower end 11a of the inflation upper section 11 prevents teat cup crawl and
95 ensures that the teat orifice closes tightly in between milk let-down cycles determined by the pulsation rate.

Particular forms of the invention have been described and illustrated by way of example,
100 but it will be appreciated that other variations of and modifications to the invention can take place without departing from the scope of the appended claims. The present invention particularly lies in the provision of the two-section
105 inflation body, and variations in the collar, teat cup shell engaging parts, and other parts of the inflation can take place.

CLAIMS

110 1. A teat cup milking inflation comprising a resilient upright tubular body part arranged to be located and contained within an upright rigid tubular shell with upper and lower portions of the body part being respectively sealably engageable with upper and lower parts of the shell, an annular space being formed about the contained body part and to which a pulsating vacuum or pressure can be applied, said contained body part being divided into an
115 upper section and a communicating lower section by an intermediate waisted junction portion having a passage communicating with the upper and lower sections, the upper section being arranged for location about an
120 animal's teat and having an upper collar part defining the inflation mouth, and the lower section having its lower end part connectable to a vacuum milk line.

2. A teat cup milking inflation as claimed
130 in claim 1 wherein the inflation tubular body

- part merges into an upper integral head part including an inwardly directed flange forming the collar part having an inner periphery defining the inflation mouth, the head part having an outer downwardly extending annular flange spaced from the body part and locatable about the upper outer part of the teat cup shell for sealing engagement therewith, the shell being cylindrical in form.
- 10 3. A teat cup milking inflation as claimed in claim 1 or claim 2 wherein the lower end portion of the inflation body part is sealably engaged with and extends through an apertured lower end portion of the teat cup shell,
- 15 a tubular extension of said inflation lower end portion being arranged to extend below and beyond the shell for connection to a vacuum milk line.
- 20 4. A teat cup milking inflation as claimed in claim 1, claim 2 or claim 3, wherein the wall of the inflation body part at the waisted junction portion is strengthened by thickening to prevent collapse of the passage or bore at said waisted junction portion between the
- 25 upper and lower sections of the body part.
5. A teat cup milking inflation as claimed in claim 4 wherein the inner surfaces of the walls of the body part at the lower end of the upper section and the communicating passage
- 30 are provided with at least one common groove or recess.
6. A teat cup milking inflation as claimed in claim 4 wherein four equally spaced grooves or recesses are provided between the
- 35 upper body part and lower section.
7. A teat cup milking inflation as claimed in any one of the preceding claims wherein the wall thickness of the lower section is slightly greater than the wall thickness of the
- 40 upper section of the inflation body part whilst remaining flexible and resilient.
8. A teat cup milking inflation as claimed in any one of the preceding claims wherein the length of the upper teat receiving section
- 45 of the body part is shorter than the length of conventional milking inflations such that in use and operation the lower orifice end of an animal's teat abuts the inner lower end of said upper section.
- 50 9. A teat cup milking inflation arranged and constructed and adapted for use substantially as hereinbefore described with reference to the accompanying drawings.

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ABSTRACT:

A teat cup milking inflation 1 has a double co-axial barrel form with the upper barrel 11 locatable on the animal's teat and the lower

barrel 12 communicating with the upper teat barrel via a waisted portion 13 having a bore 14 and a lower milk outlet tube part 10 to which suction is applied, both barrels being located with a rigid shell 6 and the lower barrel 12 being also partially collapsible under the pulsating vacuum/air pressure. The portion 13 is thickened and the inner wall is provided with grooves 15, with the aim of preventing "crawl". 